# Presenting Data Effectively

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Use this sheet to make notes about the takeaway lessons from this talk. What do you want to remember from this presentation? Write it here. If a visual pops into your mind, sketch it here. When a question springs to mind, write it down before you forget it.

This is your opportunity to create your own handout with the key takeaway points that are most relevant for you and your work.
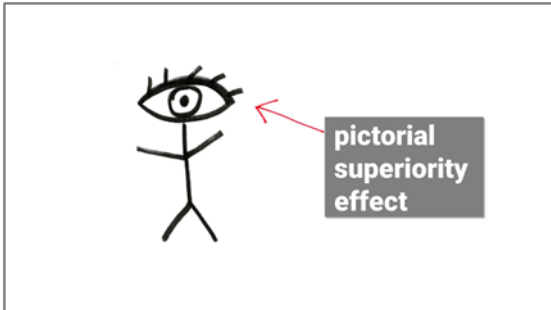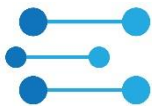

Science of Communication

Graphic elements are good at grabbing attention.

Graphic design helps readers digest our information.

The more they digest, the more they will retain in their long-term memory.
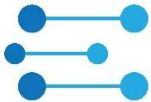
EVERGREEN DATA 4 STEP VISUALIZATION PROCESS

1. **WHAT'S THE POINT?** Write it here on a new line.

3. **WHAT IS THE BEST CHART TYPE?** Sketch it below.

2. **WHO IS THE AUDIENCE & HOW WILL THIS BE DELIVERED TO THEM?** Describe their data needs & literacy. List the software & platforms.

4. **HOW CAN YOU SHARPEN THE POINT?** Add emphasis above.

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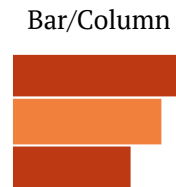
Cleveland & McGill 1984
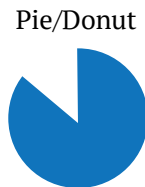
Chart Choosing

Area is hard to interpret accurately. Humans are better at judging length.

Pie charts produce errors in interpretation.

Graph as high up in the hierarchy as possible.

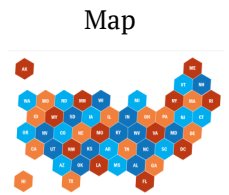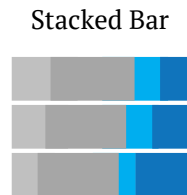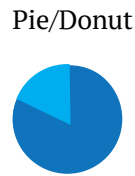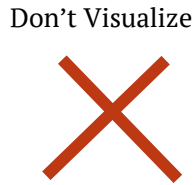Map: presentationmagazine.com/editable-maps

Quantitative Chart Chooser 4.1
by Stephanie Evergreen

When a Single Number is Important
- Big Number — 23%
- Icon Array
- Pie/Donut
- Bar/Column

When there are Parts of A Whole
- Don't Visualize
- Pie/Donut
- Stacked Bar
- Histogram
- Tree Map
- Map

How 2 + Numbers are Alike or Not
- Side by Side
- Slopegraph
- Back-to-Back
- Dot Plot
- Dumbbell Dot
- Small Multiples

What the Survey Says
- Stacked Bar
- Diverging Bar
- Aggregated Bar
- Bar/Column
- Lollipop
- Nested
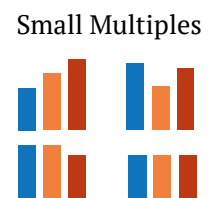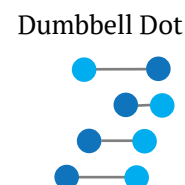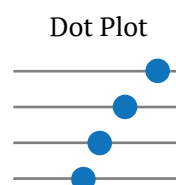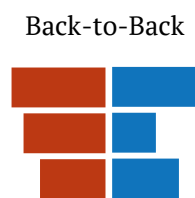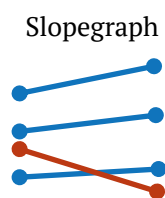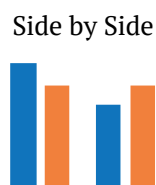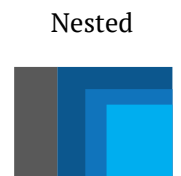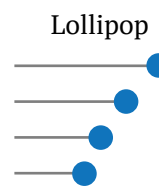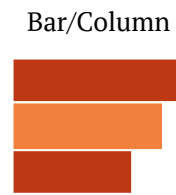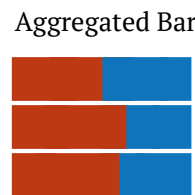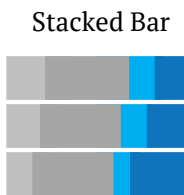
Hey, Things Changed Over Time
- Line
- Stacked Column
- Deviation Bar
- Slopegraph
- Dot Plot
- Sankey
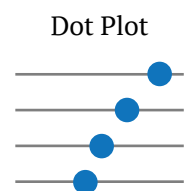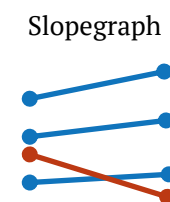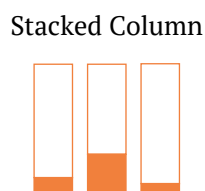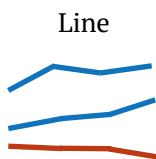
How we are Better or Not than a Benchmark
- Benchmark Line
- Combo
- Bullet Chart
- Indicator Dots
  - Metric A
  - Metric B
  - Metric C
- Overlapping Bar
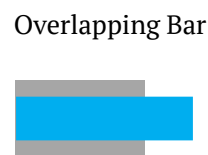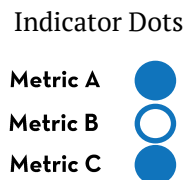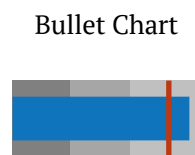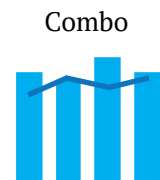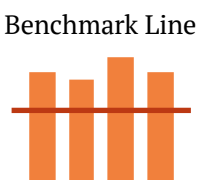
How This Changes when That Does
- Scatterplot
- Draw It — A, B, C
- Don't Visualize
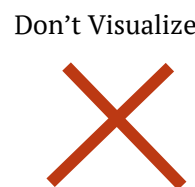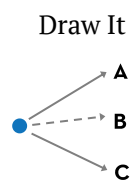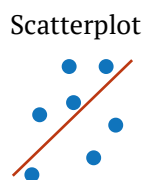
For more see
StephanieEvergreen.com/blog
Presenting Data Effectively
Effective Data Visualization

Data Visualization Checklist

by Stephanie Evergreen & Ann K. Emery
February 2018

This checklist is meant to be used as a guide for the development of high impact data visualizations. Rate each aspect of the data visualization by circling the most appropriate number, where 2 points means the guideline was fully met, 1 means it was partially met, and 0 means it was not met at all. n/a should not be used frequently, but reserved for when the guideline truly does not apply. For example, a pie chart has no axes lines or tick marks to rate. If the guidelines has been broken intentionally to make a point, rate it n/a and deduct those points from the total possible. Refer to the Data Visualization Anatomy Chart on the last page for guidance on vocabulary and the Resources at the end for more details.

	Guideline	**Rating**
Text Graphs don't contain much text, so existing text must encapsulate your message and pack a punch.	**6-12 word descriptive title is left-justified in upper left corner** Short titles enable readers to comprehend takeaway messages even while quickly skimming the graph. Rather than a generic phrase, use a descriptive sentence that encapsulates the graph's finding or "so what?" Western cultures start reading in the upper left, so locate the title there.	2 1 0 n/a
	Subtitle and/or annotations provide additional information Subtitles and annotations (call-out text within the graph) can add explanatory and interpretive power to a graph. Use them to answer questions a viewer might have or to highlight specific data points.	2 1 0 n/a
	Text size is hierarchical and readable Titles are in a larger size than subtitles or annotations, which are larger than labels, which are larger than axis labels, which are larger than source information. The smallest text - axis labels - are at least 9 point font size on paper, at least 20 on screen.	2 1 0 n/a
	Text is horizontal Titles, subtitles, annotations, and data labels are horizontal (not vertical or diagonal). Line labels and axis labels can deviate from this rule and still receive full points. Consider switching graph orientation (e.g., from column to bar chart) to make text horizontal.	2 1 0 n/a
	Data are labeled directly Position data labels near the data rather than in a separate legend (e.g., on top of or next to bars and next to lines). Eliminate/embed legends when possible because eye movement back and forth between the legend and the data can interrupt the brain's attempts to interpret the graph.	2 1 0 n/a
	Labels are used sparingly Focus attention by removing the redundancy. For example, in line charts, label every other year on an axis. Do not add numeric labels *and* use a y-axis scale, since this is redundant.	2 1 0 n/a

Arrangement

Improper arrangement of graph elements can confuse readers at best and mislead viewer at worst. Thoughtful arrangement makes a data visualization easier for a viewer to interpret.

Proportions are accurate   2 1 0 n/a
A viewer should be able measure the length or area of the graph with a ruler and find that it matches the relationship in the underlying data. Y-axis scales should be appropriate. Bar charts start axes at 0. Other graphs can have a minimum and maximum scale that reflects what should be an accurate interpretation of the data (e.g., the stock market ticker should not start at 0 or we won't see a meaningful pattern).

Data are intentionally ordered   2 1 0 n/a
Data should be displayed in an order that makes logical sense to the viewer. Data may be ordered by frequency counts (e.g., from greatest to least for nominal categories), by groupings or bins (e.g., histograms), by time period (e.g., line charts), alphabetically, etc. Use an order that supports interpretation of the data.

Axis intervals are equidistant   2 1 0 n/a
The spaces between axis intervals should be the same unit, even if every axis interval isn't labeled. Irregular data collection periods can be noted with markers on a line graph, for example.

Graph is two-dimensional   2 1 0 n/a
Avoid three-dimensional displays, bevels, and other distortions.

Display is free from decoration   2 1 0 n/a
Graph is free from clipart or other illustrations used solely for decoration. Some graphics, like icons, can support interpretation.

Color

Keep culture-laden color connotations in mind. For example, pink is highly associated with feminine qualities in the USA.

Use sites like Color Brewer to find color schemes suitable for reprinting in black-and-white and for colorblindness.

Color scheme is intentional   2 1 0 n/a
Colors should represent brand or other intentional choice, not default color schemes. Use your organization's colors or your client's colors. Work with online tools to identify brand colors and others that are compatible.

Color is used to highlight key patterns   2 1 0 n/a
Action colors should guide the viewer to key parts of the display. Less important, supporting, or comparison data should be a muted color, like gray.

Color is legible when printed in black and white   2 1 0 n/a
When printed or photocopied in black and white, the viewer should still be able to see patterns in the data.

Color is legible for people with colorblindness   2 1 0 n/a
Avoid red-green and yellow-blue combinations when those colors touch one another. Avoid using red to mean bad and green to mean good in the same chart.

Text sufficiently contrasts background   2 1 0 n/a
Black/very dark text against a white/transparent background is easiest to read.

Lines

Excessive lines—gridlines, borders, tick marks, and axes—can add clutter or noise to a graph, so eliminate them whenever they aren't useful for interpreting the data.

Gridlines, if present, are muted   2 1 0 n/a
Color should be faint gray, not black. Full points if no gridlines are used. Gridlines, even muted, should not be used when the graph includes numeric labels on each data point.

Graph does not have border line   2 1 0 n/a
Graph should bleed into the surrounding page or slide rather than being contained by a border.

Axes do not have unnecessary tick marks or axis lines   2 1 0 n/a
Tick marks can be useful in line graphs (to demarcate each point in time along the y-axis) but are unnecessary in most other graph types. Remove axes lines whenever possible.

Graph has one horizontal and one vertical axis   2 1 0 n/a
Viewers can best interpret one x- and one y-axis. Don't add a second y-axis. Try a connected scatter plot or two graphs, side by side, instead. (A secondary axis used to hack new graph types is ok, so long as viewers aren't being asked to interpret a second y-axis.)

Overall

Graphs will catch a viewer's attention so only visualize the data that needs attention. Too many graphics of unimportant information dilute the power of visualization.

Graph highlights significant finding or conclusion   2 1 0 n/a
Graphs should have a "so what?" – either a practical or statistical significance (or both) to warrant their presence. For example, contextualized or comparison data help the viewer understand the significance of the data and give the graph more interpretive power.

The type of graph is appropriate for data   2 1 0 n/a
Data are displayed using a graph type appropriate for the relationship within the data. For example, change over time is displayed as a line graph, area chart, slope graph, or dot plot.

Graph has appropriate level of precision   2 1 0 n/a
Use a level of precision that meets your audiences' needs. Few numeric labels need decimal places, unless you are speaking with academic peers. Charts intended for public consumption rarely need p values listed.

Individual chart elements work together to reinforce the overarching takeaway message   2 1 0 n/a
Choices about graph type, text, arrangement, color, and lines should reinforce the same takeaway message.

For more support, check out:

AnnKEmery.com/blog
StephanieEvergreen.com/blog
Stephanie Evergreen's books, *Presenting Data Effectively* & *Effective Data Visualization*

Score: _____ / _____ = _____ %

Well-formatted data visualizations score between 90-100% of available points. At this level, viewers are better able to read, interpret, and retain content.

Data Visualization Anatomy Chart

Confused by the terminology? Review the anatomy charts below for illustration of what's what.
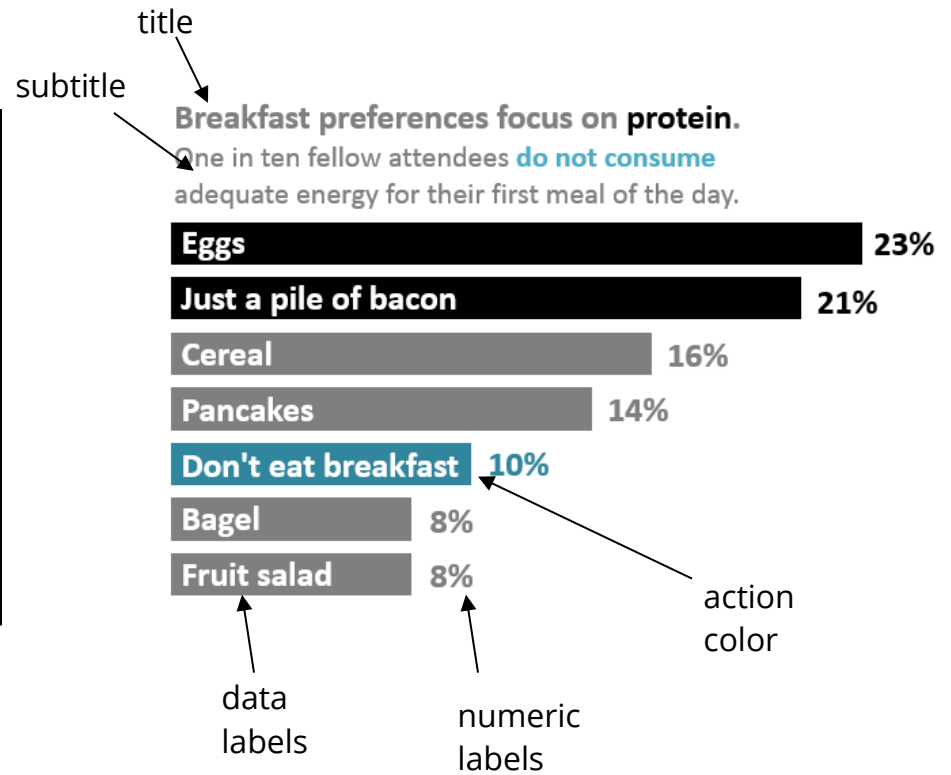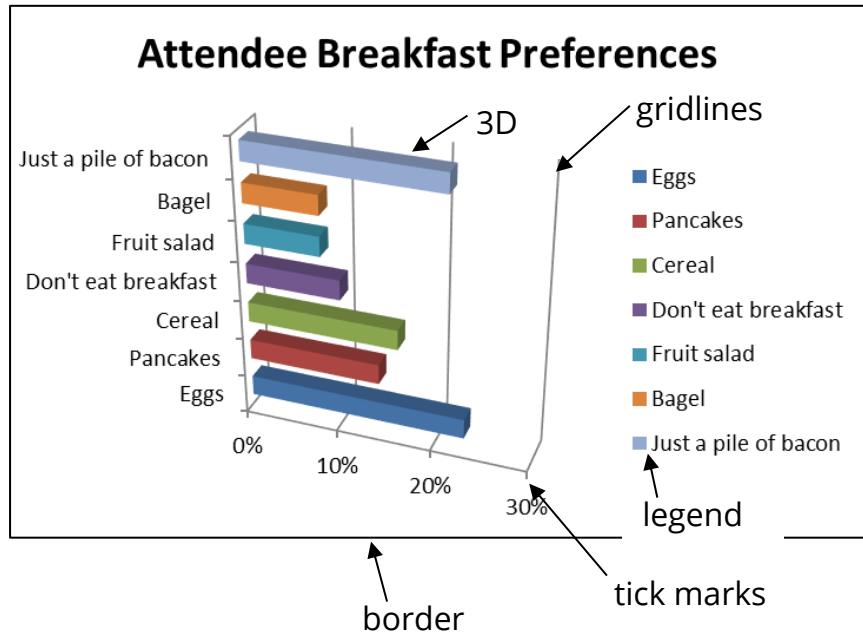
Pulling it all Together

Never distribute your slides. Have a handout.

Combine your slides and handout into the same document via a slidedoc.

Have fun! See Kylie Hutchinson's work.

Go to StephanieEvergreen.com/fun for scratch off graphs, findings cookies, and more games.

EVERGREEN DATA
INTENTIONAL REPORTING & DATA VISUALIZATION